

10 CSR 10-5.500 Control of Emissions From Volatile Organic Liquid Storage

(1) Applicability.

(A) This rule shall apply throughout the City of St. Louis and St. Charles, St. Louis, Jefferson and Franklin Counties.

(B) The provisions of this rule shall apply to all storage containers of volatile organic liquid (VOL) with a maximum true vapor pressure of one-half pound per square inch (0.5 psia) or greater in any stationary tank, reservoir or other container of forty thousand (40,000) gallon capacity or greater, except to vessels as follows:

1. Vessels with a capacity greater than or equal to forty thousand (40,000) gallons storing a liquid with a maximum true vapor pressure of less than one-half (0.5) psia;
2. Vessels permanently attached to mobile vehicles such as trucks, rail cars, barges or ships;
3. Vessels used to store beverage alcohol;
4. Pressure vessels designed to operate in excess of twenty-nine and four tenths (29.4) psia and without emissions to the atmosphere;
5. Vessels of coke oven by-product plants; or
6. Vessels used only to store or transfer petroleum liquids and that are subject to the requirements of 10 CSR 10-5.220.
7. Vessels used to store volatile organic liquids that are subject to or exempt from the requirements of 40 CFR Parts 60, 61 or 63.

(2) Definitions.

(A) Beverage alcohol—Consumable products and their process intermediates and byproducts, consisting of ethanol or mixtures of ethanol and non-volatile organic liquids.

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- (B) Liquid-mounted seal—A foam- or liquid-filled seal mounted in contact with the liquid between the wall of the storage vessel and the floating roof continuously around the circumference of the tank.
- (C) Mechanical shoe seal—A metal sheet held vertically against the wall of the storage vessel by springs or weighted levers and is connected by braces to the floating roof. A flexible coated fabric (envelope) spans the annular space between the metal sheet and the floating roof.
- (D) Volatile organic liquid—Any substance which is a liquid at storage conditions and which contains one or more volatile organic compounds as defined in 10 CSR 10-6.020.
- (E) Definitions of certain terms specified in this rule, other than those specified in this rule section, may be found in 10 CSR 10-6.020.

(3) General Provisions.

- (A) Every owner or operator storing VOL in a vessel of forty thousand (40,000) gallons or greater with a maximum true vapor pressure greater than or equal to one-half (0.5) psia but less than three quarters (0.75) psia shall be subject to the record-keeping requirements of subsection (4)(G) and the monitoring requirements of subsection (4)(H). Furthermore, every owner or operator storing VOL in a vessel of forty thousand (40,000) gallons or greater with a maximum true vapor pressure equal to three quarters (0.75) psia but less than eleven and one tenth (11.1) psia shall reduce VOC emissions from storage tanks, reservoirs or other containers as follows:
 - 1. Each fixed roof tank shall be equipped with an internal floating roof that meets the following specifications or shall be equipped with a vapor control system that meets the specifications contained in paragraph (3)(A)4. of this rule:

- A. The internal floating roof shall rest or float on the liquid surface but not necessarily in complete contact with it inside a storage vessel that has a fixed roof. The internal floating roof shall be floating on the liquid surface at all times, except during initial fill and during those intervals when the storage vessel is completely emptied and subsequently refilled. When the roof is resting on the leg supports, the process of filling, emptying or refilling shall be continuous and shall be accomplished as rapidly as possible;
- B. Each internal floating roof shall be equipped with one of the following closure devices between the wall of the storage vessel and the edge of the internal floating roof:
 - (I) A liquid-mounted seal.
 - (II) Two (2) seals mounted one above the other so that each forms a continuous closure that completely covers the space between the wall of the storage vessel and the edge of the internal floating roof. The lower seal may be vapor-mounted, but both must be continuous; or
 - (III) A mechanical shoe seal;
- C. Each opening in a non-contact internal floating roof except for automatic bleeder vents such as vacuum breaker vents and the rim space vents shall provide a projection below the liquid surface;
- D. Each opening in the internal floating roof except for leg sleeves, automatic bleeder vents, rim space vents, column wells, ladder wells, sample wells, and stub drains shall be equipped with a cover or lid which is to be

maintained in a closed position at all times with no visible gap except when the device is in actual use. The cover or lid shall be equipped with a gasket. Covers on each access hatch and automatic gauge float well shall be bolted except when they are in use;

- E. Automatic bleeder vents shall be equipped with a gasket and shall be closed at all times when the roof is floating except when the roof is being floated off or is being landed on the roof leg supports;
 - F. Rim space vents shall be equipped with a gasket and shall be set to open only when the internal floating roof is not floating or at the manufacturer's recommended setting;
 - G. Each penetration of the internal floating roof for the purpose of sampling shall be a sample well. The sample well shall have a slit fabric cover that covers at least ninety percent (90%) of the opening; and
 - H. Each penetration of the internal floating roof that allows for passage of a ladder shall have a gasketed sliding cover;
- 2. During the next scheduled tank cleaning or before March 15, 2004, whichever comes first, each internal floating roof tank shall meet the specifications set forth in subparagraphs (3)(A)1.A. through (3)(A)1.H. of this rule;
 - 3. Each external floating roof tank shall meet the following specifications:
 - A. Each external floating roof shall be equipped with a closure device between the wall of the storage vessel and the roof edge. The closure device shall consist of two (2) seals, one above the other. The lower seal is referred to as the primary seal, and the

upper seal is referred to as the secondary seal.

(I) Except as provided in subparagraph (3)(C)2.D. of this rule, the primary seal shall completely cover the annular space between the edge of the floating roof and tank wall and shall be either a liquid-mounted seal or a mechanical shoe seal.

(II) The secondary seal shall completely cover the annular space between the external floating roof and the wall of the storage vessel in a continuous fashion except as allowed in subparagraph (3)(C)2.D. of this rule.

(III) The tank shall be equipped with the closure device after the next scheduled tank cleaning, but no later than March 15, 2004;

B. Except for automatic bleeder vents and rim space vents, each opening in a non-contact external floating roof shall provide a projection below the liquid surface. Except for automatic bleeder vents, rim space vents, roof drains, and leg sleeves, each opening in the roof shall be equipped with a gasketed cover, seal or lid that is to be maintained in a closed position at all times with no visible gap except when the device is in actual use. Automatic bleeder vents shall be closed at all times when the roof is floating except when the roof is being floated off or is being landed on the roof leg supports. Rim vents shall be set open when the roof is being floated off the roof leg supports or at the manufacturer's recommended setting. Automatic bleeder vents and rim space vents shall be gasketed. Each emergency roof drain shall include a slotted membrane fabric cover

that covers at least ninety percent (90%) of the area of the opening; and

- C. The roof shall be floating off the roof leg supports on the liquid at all times except when the tank is completely emptied and subsequently refilled. The process of filling, emptying or refilling when the roof is resting on the leg supports shall be continuous and shall be accomplished as rapidly as possible;
- 4. After the next tank cleaning but no later than March 15, 2004, a closed vent system and control device respectively shall meet the following specifications:
 - A. The closed vent system shall be designed to collect all VOC vapors and gases discharged from the storage vessel and operated with no detectable emissions as indicated by an instrument reading of less than five hundred (500) parts per million (ppm) above background and visual inspections, as determined by the methods specified in 40 CFR 60.485(c), which is hereby incorporated by reference; and
 - B. The control device shall be designed and operated to reduce inlet VOC emissions by ninety percent (90%) or greater. If a flare is used as the control device, it shall meet the specifications described in the general control device requirements of 40 CFR 60.18, which is hereby incorporated by reference; or
 - 5. An alternative emission control plan equivalent to the requirements of paragraphs (3)(A)1., (3)(A)2., (3)(A)3. or (3)(A)4. of this rule that has been approved by the department and the United States Environmental Protection Agency in a federally enforceable permit.

- (B) After the next tank cleaning but no later than March 15, 2004, the owner or operator of each storage vessel with a design capacity equal to or greater than forty thousand (40,000) gallons which contains VOL that, as stored, has a maximum true vapor pressure greater than or equal to eleven and one tenth (11.1) psia shall equip each storage vessel with a closed vent system and control device as specified in paragraph (3)(A)4. of this rule.
- (C) Testing Requirements. The owner or operator of each storage vessel specified in section (1) of this rule shall comply with the requirements of paragraphs (3)(C)1., (3)(C)2. or (3)(C)3. of this rule. The applicable requirements for a particular storage vessel depends on the control equipment installed to meet the requirements of this rule.
 - 1. After installing the control equipment necessary for the source to comply with the requirements of paragraphs (3)(A)1. and (3)(A)2. of this rule for permanently affixed roofs and internal floating roofs, each owner or operator shall—
 - A. Visually inspect the internal floating roof, the primary seal, and the secondary seal (if one is in service) prior to filling the storage vessel with VOL. If there are holes, tears or other openings in the primary seal, the secondary seal or the seal fabric or defects in the internal floating roof, or both, the owner or operator shall repair the items before filling the storage vessel;
 - B. For vessels equipped with a liquid-mounted or mechanical shoe primary seal, visually inspect the internal floating roof and the primary seal or the secondary seal (if one is in service) through manholes and roof hatches on the fixed roof at least once every twelve (12) months after initial fill. If the internal floating roof is not resting on the surface of the VOL inside the storage vessel,

or if there is liquid accumulated on the roof, or if the seal is detached, or if there are holes or tears in the seal fabric, the owner or operator shall repair the items or empty and remove the storage vessel from service within forty five (45) days. If a failure that is detected during inspections required in this rule subsection cannot be repaired within forty five (45) days and if the vessel cannot be emptied within forty five (45) days, the owner or operator may request a thirty (30) day extension from the department in the inspection report required in paragraph (4)(A)2. of this rule. Such a request for an extension must document that alternate storage capacity is unavailable and specify a schedule of actions the owner or operator will take that will assure that the control equipment will be repaired or the vessel will be emptied within thirty (30) days;

- C. For vessels equipped with both primary and secondary seals-
 - (I) Visually inspect the vessel as specified in subparagraph (3)(C)1.D. of this rule at least every five (5) years; or
 - (II) Visually inspect the vessel as specified in subparagraph (3)(C)1.B. of this rule;
- D. Visually inspect the internal floating roof, the primary seal, the secondary seal if one is in service, gaskets, slotted membranes, and sleeve seals if any each time the storage vessel is emptied and degassed. If the internal floating roof has defects, the primary seal has holes, tears or other openings in the seal, or if the seal fabric or the secondary seal has holes, tears or other openings in the seal, or if the seal fabric or the gaskets no longer close off the

liquid surfaces from the atmosphere, or if the slotted membrane has more than ten percent (10%) open area, the owner or operator shall repair the items as necessary so that none of the conditions specified in this rule subsection exist before refilling the storage vessel with VOL. In no event shall inspections conducted in accordance with this provision occur at intervals greater than ten (10) years in the case of vessels subject to the annual visual inspection as specified in subparagraph (3)(C)1.B. and part (3)(C)1.C.(II) of this rule and at intervals no greater than five (5) years in the case of vessels specified in part (3)(C)1.C.(I) of this rule; and

- E. Notify the department in writing at least thirty (30) days prior to the filling or refilling of each storage vessel for which an inspection is required by subparagraphs (3)(C)1.A. and (3)(C)1.D. of this rule to afford the department the opportunity to have an observer present. If the inspection required by subparagraph (3)(C)1.D. of this rule is not planned and the owner or operator could not have known about the inspection thirty (30) days in advance of refilling the tank, the owner or operator shall notify the department at least seven (7) days prior to the refilling of the storage vessel. Notification shall be made by telephone immediately followed by written documentation demonstrating why the inspection was unplanned. Alternatively, this notification including the written documentation may be made in writing and sent by express mail so that it is received by the department at least seven (7) days prior to the refilling.

- 2. The owner or operator of external floating roof tanks shall—

- A. Determine the gap areas and maximum gap widths between the primary seal and the wall of the storage vessel and between the secondary seal and the wall of the storage vessel.
 - (I) Measurements of gaps between the tank wall and the primary seal (seal gaps) shall be performed during the hydrostatic testing of the vessel or within sixty (60) days after the initial fill with VOL and at least once every five (5) years thereafter.
 - (II) Measurements of gaps between the tank wall and the secondary seal shall be performed within sixty (60) days after the initial fill with VOL and at least once per year thereafter.
 - (III) If any source ceases to store VOL for a period of one (1) year or more, subsequent introduction of VOL into the vessel shall be considered an initial fill for the purposes of parts (3)(C)2.A.(I) and (3)(C)2.A.(II) of this rule;
- B. Determine gap widths and areas in the primary and secondary seals individually according to the following procedures:
 - (I) Measure seal gaps, if any, at one or more floating roof levels when the roof is floating off the roof leg supports;
 - (II) Measure seal gaps around the entire circumference of the tank in each place where a one-eighth inch (1/8") in diameter uniform probe passes freely without forcing or binding against seal between the seal and the wall of the storage vessel and measure the

circumferential distance of each such location; and

- (III) Determine the total surface area of each gap described in part (3)(C)2.B.(II) of this rule by using probes of various widths to measure accurately the actual distance from the tank wall to the seal and multiplying each such width by its respective circumferential distance;
- C. Add the gap surface area of each gap location for the primary seal and the secondary seal individually and divide the sum for each by the nominal diameter of the tank and compare each ratio to the respective standards in subparagraph (3)(C)2.D. of this rule;
- D. Make necessary repairs or empty the storage vessel within forty five (45) days after identification in any inspection for seals not meeting the requirements listed in parts (3)(C)2.D.(I) and (3)(C)2.D.(II).
 - (I) The accumulated area of gaps between the tank wall and the mechanical shoe or liquid-mounted primary seal shall not exceed one inch (1.0") per foot of tank diameter, and the width of any portion of any gap shall not exceed one and one-half inches (1.5"). There shall be no holes, tears or other openings in the shoe, seal fabric or seal envelope.
 - (II) The secondary seal shall meet the following requirements:
 - (a) Be installed above the primary seal so that it completely covers the space between the roof edge and the tank wall except as provided in part (3)(C)2.B.(III) of this rule;

- (b) The accumulated area of gaps between the tank wall and the secondary seal used in combination with a metallic shoe or liquid-mounted primary seal shall not exceed one inch (1.0") per foot of tank diameter, and the width of any portion of any gap shall not exceed one-half inch (0.5"). There shall be no gaps between the tank wall and the secondary seal when used in combination with vapor mounted primary seal; and
 - (c) There shall be no holes, tears or other openings in the seal or seal fabric.
- (III) If a failure that is detected during inspections required in subparagraph (3)(C)2.A. of this rule cannot be repaired within forty five (45) days and if the vessel cannot be emptied within forty five (45) days, the owner or operator may request a thirty (30) day extension from the department in the inspection report required in subparagraph (3)(C)2.D. of this rule. Such extension request must include a demonstration of unavailability of alternate storage capacity and a specification of a schedule that will assure that the control equipment will be repaired or the vessel will be emptied as soon as possible;
- E. Notify the department thirty (30) days in advance of any gap measurements required by subparagraph (3)(C)2.A. of this rule to afford the department the opportunity to have an observer present; and

- F. Visually inspect the external floating roof, the primary seal, secondary seal, and fittings each time the vessel is emptied and degassed.
 - (I) If the external floating roof has defects, if the primary seal has holes, tears or other openings in the seal or the seal fabric, or if the secondary seal has holes, tears or other openings in the seal or the seal fabric, the owner or operator shall repair the items as necessary so that none of the conditions specified in this rule subsection exist before filling or refilling the storage vessel with VOL.
 - (II) For all the inspections required by subparagraph (3)(C)2.F. of this rule, the owner or operator shall notify the department in writing at least thirty (30) days prior to the filling or refilling of each storage vessel to afford the department the opportunity to inspect the storage vessel prior to refilling. If the inspection required by subparagraph (3)(C)2.F of this rule is not planned and the owner or operator could not have known about the inspection thirty (30) days in advance of refilling the tank, the owner or operator shall notify the department at least seven (7) days prior to the refilling of the storage vessel. Notification shall be made by telephone immediately followed by written documentation demonstrating why the inspection was unplanned. Alternatively, this notification including the written documentation may be sent by express mail so that it is received by the department at least seven (7) days prior to the refilling.

3. The owner or operator of each source that is equipped with a closed vent system and a flare to meet the requirements of paragraph (3)(A)4. of this rule shall meet the requirements specified in the general control device requirements of 40 CFR 60.18(e) and (f), which are hereby incorporated by reference.
- (4) Reporting and Record Keeping. The owner or operator shall maintain all records required by this rule section, except for the records required by subsection (4)(F) of this rule, on site for at least five (5) years. The records required by subsection (4)(F) of this rule shall be kept on site for the life of the source. The records required by this rule shall be made available to the department immediately upon request.
 - (A) After installing control equipment in accordance with paragraph (3)(A)1. or (3)(A)2. of this rule for fixed roofs and internal floating roofs, the owner or operator shall—
 1. Keep a record of each inspection performed as required by subparagraphs (3)(C)1.A., (3)(C)1.B, (3)(C)1.C, and (3)(C)1.D. of this rule. Each record shall identify the storage vessel on which the inspection was performed and shall contain the date the vessel was inspected and the observed condition of each component of the control equipment including seals, internal floating , and fittings;
 2. If any of the conditions described in subparagraph (3)(C)1.B. of this rule are detected during the annual visual inspection required by subparagraph (3)(C)1.B. of this rule, report to the department within twenty (20) days after the inspection the identity of the storage vessel, the nature of the defects, and the date the storage vessel was emptied or the nature of and date the repair was made; and

3. After each inspection required by subparagraph (3)(C)1.C. of this rule where tears or holes in the seal or seal fabric, or defects in the internal floating roof, or other control equipment defects listed in part (3)(C)1.C.(II) of this rule are discovered, report to the department within twenty (20) days after the inspection the identity of the storage vessel and the reason it did not meet the specifications of paragraph (3)(A)1., (3)(A)2. or (3)(C)1. of this rule, and list each repair made.
- (B) After installing control equipment in accordance with paragraph (3)(A)3. of this rule for external floating roofs, the owner or operator shall—
1. Within sixty (60) days after performing the seal gap measurements required by subparagraphs (3)(C)2.A. of this rule, furnish the department with a report that contains the date of measurement, the raw data obtained in the measurement and the calculations of this rule described in subparagraphs (3)(C)2.B. and (3)(C)2.C. of this rule;
 2. Maintain records of each gap measurement performed as required by subparagraph (3)(C)2.B. of this rule. Such records shall identify the storage vessel in which the measurement was performed and shall contain the date of measurement, the raw data obtained in the measurement and the calculations of this rule described in subparagraphs (3)(C)2.B. and (3)(C)2.C. of this rule; and
 3. After each seal gap measurement that detects gaps exceeding the limitations specified by subparagraph (3)(C)2.D. of this rule, submit a report to the department within twenty (20) days after the inspection identifying the vessel and containing the information specified in paragraph

(4)(B)1. of this rule and the date the vessel was emptied or the repairs were made and the date of the repair.

- (C) After installing control equipment to comply with subsection (3)(C). of this rule for closed vent systems and control device other than a flare, the owner or operator shall maintain a record of the measured values of the parameters monitored in accordance with the requirements of this rule.
- (D) After installing a closed vent system and flare to comply with subsection (3)(C) of this rule, the owner or operator shall—
 - 1. Provide the department with a report containing the measurements required by 40 CFR 60.18(f)(1), (2), (3), (4), (5), and (6) within six (6) months after the initial start-up date;
 - 2. Maintain records of all periods of operation during which the flare pilot flame is absent; and
 - 3. Report semiannually all periods recorded under 40 CFR 60.115b(d)(2), which is hereby incorporated by reference, in which the pilot flame was absent.
- (E) The owner or operator shall maintain records of tank cleaning operations to document the date when control devices are required.
- (F) The owner or operator of each storage vessel specified in section (1) of this rule shall maintain readily accessible records of the dimensions of the storage vessel and an analysis of the capacity of the storage vessel. Each storage vessel with a design capacity less than forty thousand (40,000) gallons is subject to no provision of this rule other than those required by maintaining readily accessible records of the dimensions of the storage vessel and analysis of the capacity of the storage vessel.

(G) Except as provided in paragraphs (4)(H)3. and (4)(H) 4.of this rule, the owner or operator of each storage vessel subject to the requirements in subsection (3)(A) or (3)(B) of this rule with a design capacity greater than or equal to forty thousand (40,000) gallons storing a liquid with a maximum true vapor pressure greater than or equal to one half (0.5) psia but less than three quarters (0.75) psia shall maintain a record of the VOL storage, the period of storage, and the maximum true vapor pressure of the VOL during the respective storage period.

(H) Monitoring Requirements.

1. Except as provided in paragraph (4)(H)4. of this rule, the owner or operator of each storage vessel with a design capacity greater than or equal to forty thousand (40,000) gallons storing a liquid with a maximum true vapor pressure that is normally less than three quarters (0.75) psia shall notify the department within thirty (30) days when the maximum true vapor pressure of the liquid exceeds three quarters (0.75) psia.
2. Available data on the storage temperature may be used to determine the maximum true vapor pressure.
 - A. For vessels operated above or below ambient temperatures, the maximum true vapor pressure is calculated based upon the highest expected calendar-month average of the storage temperature. For vessels operated at ambient temperatures, the maximum true vapor pressure is calculated based upon the maximum local monthly average ambient temperature as reported by the National Weather Service.
 - B. For other liquids, the vapor pressure shall be determined by an appropriate test method in section (5) of this rule or calculated by an appropriate method approved by the department.

3. The owner or operator of each vessel storing a mixture of indeterminate or variable composition shall be subject to the following:
 - A. Prior to the initial filling of the vessel, the maximum true vapor pressure for the range of anticipated liquid compositions to be stored will be determined using the methods described in paragraph (4)(H)2. of this rule; and
 - B. For vessels in which the vapor pressure of the anticipated liquid composition is one-half (0.5) psia or greater but less than three quarters (0.75) psia, an initial physical test of the vapor pressure is required; a physical test at least once every six (6) months thereafter is required as determined by an appropriate test method in section (5) of this rule.
4. The owner or operator of each vessel equipped with a closed vent system and control device meeting the specifications of subsection (3)(A) or (3)(B) of this rule is exempt from the requirements of paragraphs (4)(H)1. and (4)(H)2. of this rule.

(5) Test Methods.

- (A) Compliance with the requirements of this rule shall be determined by applying the following test methods, as appropriate:
 1. Test Methods 1 and 2 (40 CFR 60, Appendix A) for determining flow rates, as necessary;
 2. Test Method 18 (40 CFR 60, Appendix A) for determining gaseous organic compound emissions by gas chromatography;
 3. Test Method 21 (40 CFR 60, Appendix A) for determination of volatile organic compound leaks;

4. Test Method 22 (40 CFR 60, Appendix A) for visual determination of fugitive emissions from material sources and smoke emissions from flares;
5. Test Method 25 (40 CFR 60, Appendix A) for determining total gaseous nonmethane organic emissions as carbon;
6. Test Methods 25A or 25B (40 CFR 60, Appendix A) for determining total gaseous organic concentrations using flame ionization or nondispersive infrared analysis;
7. Test method described in 40 CFR 60.113(a)(ii) for measurement of storage tank seal gap;
8. Determination of true vapor pressure using American Society for Testing and Materials (ASTM) Test Methods D323-94, D4953, D5190 or D5191 for the measurement of Reid vapor pressure; and
9. Other test methods for determining compliance may be used if found to be equivalent after review by the department.

EPA Rulemakings

FRM: 65 C.F.R. 31489 (5/18/2000)

PRM: 65 C.F.R. 8094 (2/17/2000)

State Submission: 10/10/99

State Final: 10 C.S.R. 10-5 (2/29/00)

APDB File: MO-130

Description: This new rule establishes emission standards for all installations storing large volumes of volatile organic liquids in the St. Louis nonattainment area.

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Difference Between the State and EPA-Approved Regulation

None.